

Listing of claims:

1. (Currently Amended) A rare-earth Y-zeolite-containing catalyst for cracking hydrocarbons, characterized in that the rare-earth content in the crystal lattice of the rare-earth Y-zeolite, calculated in RE_2O_3 , is from 4 to 15% by weight, the original unit cell size is from 2.450nm to 2.458nm and the equilibrium unit cell size after 100% steam-aging treatment at 800°C for 17 hours is larger than ~~2.430~~ ~~2.435~~ nm.
2. (Original) A catalyst according to claim 1, characterized in that the rare-earth content in the crystal lattice of the rare-earth Y-zeolite, calculated in RE_2O_3 , is from 6 to 12% by weight.
3. (Original) A catalyst according to claim 1, characterized in that the equilibrium unit cell size is larger than 2.440nm.
4. (Original) A catalyst according to claim 3, characterized in that the equilibrium unit cell size is larger than 2.445nm.
5. (Previously Presented) A catalyst according to claim 1, characterized in that the Na_2O content of the rare-earth Y-zeolite is less than 1.0% by weight.
6. (Original) A catalyst according to claim 5, characterized in that the Na_2O content of the rare earth Y-zeolite is less than 0.5% by weight.
7. (Previously Presented) A catalyst according to claim 1, characterized in that the Si/Al ratio of the rare-earth Y-zeolite is from 6 to 20.
8. (Original) A catalyst according to claim 7, characterized in that the Si/Al ratio of the rare-earth Y-zeolite is from 8 to 15.
9. (Previously Presented) A catalyst according to claim 1, characterized in that the differential thermal collapse temperature of the rare-earth Y-zeolite is higher than 1000°C.

10. (Original) A catalyst according to claim 9, characterized in that the differential thermal collapse temperature is from 1000 to 1056°C.

11. (Original) A catalyst according to claim 1, characterized in that the content of the rare-earth Y-zeolite is from 10 to 50% by weight.

12. (Original) A catalyst according to claim 11, characterized in that the content of the rare-earth Y-zeolite is from 15 to 40% by weight.

13. (Original) A catalyst according to claim 12, characterized in that the content of the rare-earth Y-zeolite is from 15 to 35% by weight.

14. (Original) A catalyst according to claim 1, characterized in that said catalyst contains zeolite with MFI structure, whose weight ratio to the rare-earth Y-zeolite is from 0.01 to 0.5.

15. (Previously Presented) A method for preparing the catalyst for cracking hydrocarbons according to claim 1, characterized in that the method has following steps:

(1) drying the rare-earth Y-zeolite till its water content less than 10% by weight, then in a weight ratio of SiCl₄:Y-zeolite of 0.1-0.9:1, the zeolite reacts with SiCl₄ gas carried by dry air at 150-600°C for 10min to 6 hours and is purged by dry air for 5min to 2 hours after reaction, and then the residual soluble by-products in the zeolite are washed out by deionized water; and

(2) 10-50% by weight of the rare-earth Y-zeolite obtained in step (1), 10-60% by weight of a binder and 2-75% by weight of a clay are mixed and pulped, and formed by spray drying.

16. (Original) A method according to claim 15, characterized in that the rare-earth Y-zeolite disclosed in step (1) is selected from the industrial product of REHY and REY zeolite, or the product of the rare-earth ion exchanged NaY zeolite with or without drying.

17. (Original) A method according to claim 16, characterized in that the rare-earth content of the industrial REHY zeolite, calculated in RE₂O₃, is from 6 to 16% by weight and the Na₂O content is more than 4% by weight.

18. (Original) A method according to claim 16, characterized in that the rare-earth content of the industrial REY zeolite, calculated in RE_2O_3 , is from 10 to 20% by weight and the Na_2O content is more than 2% by weight.

19. (Previously Presented) A method according to claim 16, characterized in that the rare-earth ion exchange process of NaY zeolite is carried out by exchanging a NaY zeolite with an Si/Al ratio higher than 3.5 and an aqueous solution of rare-earth chloride in a weight ratio $\text{NaY:RECl}_3 \cdot \text{H}_2\text{O}$ of 1: 0.1-0.25: 5-10 at 80-90°C for 30 to 60min under a pH of more than 3.5.

20. (Original) A method according to claim 15, characterized in that the water content of the rareearth Y-zeolite disclosed in step (1) after drying is less than 5% by weight.

21. (Original) A method according to claim 15, characterized in that the reaction temperature disclosed in step (l) is from 200 to 500°C.

22. (Original) A method according to claim 15, characterized in that the content of the rare-earth Y-zeolite is from 15 to 40% by weight.

23. (Original) A method according to claim 15, characterized in that the content of the binder is from 15 to 40% by weight.

24. (Original) A method according to claim 15, characterized in the that content of the clay is from20 to 60% by weight.

25. (Previously Presented) A method according to claim 15, characterized in that the binder is selected from one or more of pseudoboehmite, alumina sol, silica sol and phosphorusalumina sol.

26. (Previously Presented) A method according to claim 23, characterized in that the binder is a double-alumina binder of pseudoboehmite and alumina sol in a weight ratio of 10-40: 0-30.

27. (Previously Presented) A method according to claim 26, characterized in that the weight ratio of pseudoboehmite and alumina sol is 15-25: 2-25.

28. (Previously Presented) A method according to claim 26, characterized in that the weight ratio of acid and alumina in the acid treatment of pseudoboehmite is 0.1-0.6 when using a double-alumina binder.

29. (Currently Amended) A method according to claim 28, characterized in that the weight ratio of acid and alumina is 0.15-0.35.

30. (Previously Presented) A method according to claim 15, characterized in that the clay is the clay usually used in cracking catalyst matrix.

31. (Original) A method according to claim 30, characterized in that the clay is selected from Kaolin, halloysite, montmorillonite, bernonite or sepiolite.

32. (Previously Presented) A method of processing residuum, comprising contacting the residuum with a catalyst according to claim 1.

33. (Previously Presented) A method according to claim 32, characterized in that the residuum is selected from full atmospheric residuum, distilled oil blended with atmospheric residuum or distilled oil blended with vacuumed residuum.